TRADING TECHNOLOGIES®

TT SIM Feature Guide

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Trading Technologies International, Inc.

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Table of Contents

About This Manual 4

TT SIM 4
Additional Considerations 5

Chapter 1: TT SIM Description and Initial Setup 6

Overview 6
Installation 7
Post Installation 8

Chapter 2: TT SIM Functionality 10

TT SIM Behavior 10
Matching and Product States 11
Pro-rata Matching Support 13
Trading with TT SIM 17
Administrating TT SIM 20

Chapter 3: Frequently Asked Questions 24

Requirements 24
Functionality 26

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About This Manual

TT SIM

Overview

This manual describes the installation and configuration for the Trading Technologies' TT SIM™.

Common Terms and Abbreviations

This manual uses the following terminology convention throughout:

- Exchange: This is the trading exchange (e.g., the SGX, CME, ICE) to which the TT Gateway connects.
- *Exchange-Flavor*: This is the name of the TT Gateway as selected during its installation.

Chapter Overviews

This manual includes the following chapters:

Chapter	Description
Chapter 1	Discusses the general features and installation of TT SIM™.
Chapter 2	Discusses all functionality unique to TT SIM™.

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Additional Considerations

Related Documentation

This manual is part of a comprehensive set of documentation that includes but is not limited to the following topics and documents:

- *TT Gateway Architecture System Administration Manual Version 7.X*.
- *X_TRADER® User Manual Version 7.X*
- *TT User Setup System Administration Manual Version 7.X*

For copies of these documents, visit the TT Customer Portal.

Text Formatting Conventions

This guide uses a set of terms, symbols, and typographic conventions to categorize specific information. Familiarity with these conventions will help you use this manual more effectively:

Convention	Description
ALL CAPITALS	Indicates operating system commands and acronyms.
Courier New Courier New Bold	Indicates examples and anything that you must type exactly as it appears. For example, if asked to "Type: show version", you would type the characters formatted in Courier New Bold (show version), exactly as they appear.
Bold	Indicates command buttons, manual section names, menu options folder/directory names, and file names.
Italic	Indicates variables, including variable text. Variable text is used for labels that change dynamically based on their current context. The wording of variable text does not exactly match what you see on your screen. The title of books, official documents, articles, and papers are also formatted in italics.
*	A wildcard. The asterisk signifies any number of variable characters. For instance, in the case of *.doc, the asterisk is a wildcard, and ***.doc** signifies any file ending in **.doc**.
Date	Unless otherwise described, Date is *DDMMYYYY*, where *DD* is the two-digit day, *MM* is the two-digit month, and *YYYY* is the four-digit year.

Table 1. Text Formatting Conventions

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1 TT SIM Description and Initial Setup

Overview

Product Overview

TT SIM™ is a real-time simulated trading solution that operates with X_TRADER® 7.11.2 and above. This solution runs on the local workstation and offers a myriad of uses: testing out new trading strategies, training for traders, API solution testing, etc.

This product differs from Trading Technologies' previous simulation solution (the TT SIM Gateway and TT Trainer) as it does not require a separate server or hosting. Rather, the new TT SIM™ is deployed locally on the X_TRADER® workstation. Once the trader wishes to switch from running in production mode, they can simply switch via a button in the X_TRADER® login screen to simulation mode.

While running in simulation mode, the trader will have free access to X_TRADER® Pro, ADL™, Algo Strategy Engine, Synthetic Strategy Engine, X_TRADER® API and TT API, regardless of whether licenses exist for those TT products. For more information on running TT SIM via X_TRADER®, please refer to the *X_TRADER® User Manual*.

Hardware and Software Requirements

To run TT SIM™, the following minimum client application versions must be installed:

- TT User Setup 7.4.2
- X_TRADER® 7.11.2

To utilize X_TRADER® API applications, TT SIM™ requires a minimum of X_TRADER® API 7.7.3.

Warning: TT strongly recommends that users do not place the workstation into Sleep or Hibernate mode when using TT SIM. Entering Sleep or Hibernate mode may prevent the user from receiving market data and cause Guardian to display as 'Price Feed Down'.

If this occurs, users may use the Restart Simulation functionality to reconnect the simulated exchanges.

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Installation

Pre-Installation Tasks

Users must ensure that the minimum client applications required for TT SIM™ are installed.

TT SIM™ allows administrators to establish custom trader setups for simulation using TT User Setup. To enable custom values for simulation trading, please contact your System Administrator to discuss the following:

- Custom simulation risk limits via TT User Setup
- Access to new products in simulation mode via TT User Setup

Note: If a trader is configured to access all products for a particular market, administrators must create a custom trader setup for the simulation environment.

For more information, refer to the section called **Trader Setup** on page 20.

Workstation Power Settings

TT SIM requires a consistent connection to maintain functionality. To avoid issues, users must ensure that the computer that hosts TT SIM does not enter the Sleep/ Hibernate state. TT strongly recommends setting the Windows **Put the Computer to Sleep** option to **Never** in the power options.

Failure to do so may result in missing market data and Guardian displaying as Price Feed Down for the simulated exchanges when the computer wakes up.

Installing the TT SIM Software

Currently, users must download and install the TT SIM™ as a separate installation. Future versions of TT SIM™ will be available as part of the X_TRADER® installation.

Note: Prior to installing TT SIM™, ensure that the minimum client applications are installed.

The TT SIM™ components (Order Server, Price Server, Fill Server, Product Server and Matching Engine) may be upgraded or uninstalled separately from X_TRADER®. Likewise, TT SIM components will not be uninstalled in the event that X_TRADER® is uninstalled.

TT SIM™ installs with free, local versions of Algo Strategy Engine and Synthetic Strategy Engine in addition to the other TT SIM™ components. The local Strategy Engines run on the trader's workstation and are only accessible in simulation mode.

Warning: TT requires that users do not use a scheduling service, like TTChron, on the same workstation as TT SIM.

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Post Installation

Overview

When starting X_TRADER®, you simply select simulation or production mode in the Universal Login window. Use the radio buttons to select whether X_TRADER® starts in production mode (**LIVE**) or simulation mode (**TT SIM**).

Figure 2. TT SIM in Production Mode

To switch between modes, simply exit and re-launch X_TRADER®. Then, select the mode you would like to start from the Universal Login window.

Trader Login

To log in to TT SIM™, traders can use their Universal Login ID and password. Traders do not need a separate login ID or password for simulation and production mode. After the trader has entered their login information, TT SIM™ will connect to the production TT User Setup database and download product and risk information associated with that login. For more information regarding product and risk information for TT SIM™, please contact your System Administrator or refer to the *TT User Setup System Administration Manual*.

Note: X_TRADER®, and all other TT applications on the client workstation, can only operate in one mode (simulation or production) at a time.

Configuring the System

All configuration for TT SIM™ is handled in the Simulation Settings window in X_TRADER®. On the **Settings** menu, select **Simulation Settings** to access the Simulation Settings window.

Note: You can only access the Simulation Settings while in simulation mode.

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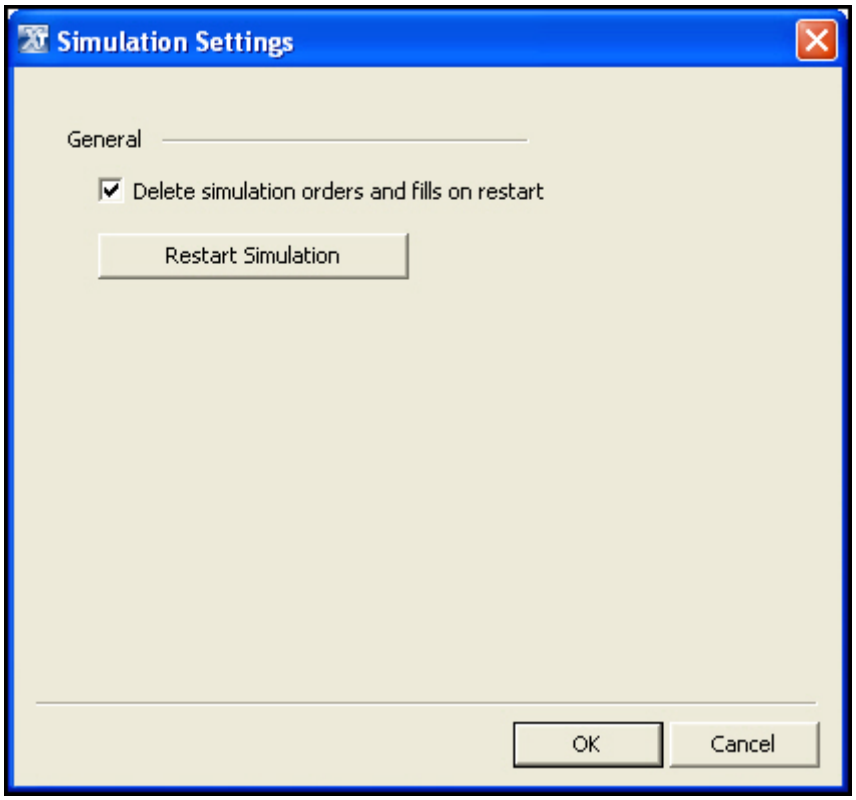

Figure 3. Simulation Settings Window

You can use the Restart Simulation button to reset the current simulation trading environment. Use the **Delete simulation orders and fills on restart** option to control market behavior on restart.

Option	Description
Delete simulation orders and fills on restart	Sets whether the user enters simulation with a clear order book. Traders should use this option to reset all orders and fills when approaching their simulation credit limits.

Table 4. TT SIM Configuration

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2 TT SIM Functionality

TT SIM Behavior

Market Updates

TT SIM™ continues to update based on snapshots from the production price feeds.

When trading in simulation mode, TT SIM™ combines production trading activity with all trades entered by the user into the simulated market. Therefore, trades entered into simulation directly reflects in all market data (e.g., updates High/ Low, LastPrc, Volume, etc.).

The market reflects the trader's simulated working orders. When a simulation trader's orders fill against production prices, the production prices will reflect the lower quantity until the next snapshot of market activity is received from production.

Order Types

The following order types are supported on TT SIM™:

- Limit
- Market
- Fill or Kill
- Immediate or Cancel
- Minimum Volume
- Stop Limit
- Stop Market
- Timed (Start Date/Time, End Date/Time)
- Triggered (Stops, If Touched)
- Trailing (Stops, If Touched, Limit)
- Sliced (Iceberg, Time Sliced, Volume Sliced, Time Duration, Volume Duration)
- Retry (Machine Gun)

Unsupported Functionality

TT SIM™ will not initially provide support for the following functionality:

- Detailed Depth
- Strategy Creation
- Wholesale/Block Trades
- Request for Quote (RFQ)
- Recording/replaying market data
- Exchange-specific order types (e.g., Market to Limit orders on OSE)

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Matching and Product States

Matching Algorithm

TT SIM 7.16.1 and higher offer a configuration file that determines which products use Pro-rata matching. Users may add/remove products to configure matching for specific products. Products that are not configured for Pro-rata are matched using First-in, First-out (FIFO) time/priority matching. The matching occurs as configured regardless of the matching engine of the underlying market.

Previous versions of TT SIM will only perform First-in, First-out (FIFO) time/ priority matching regardless of the matching engine of the underlying market.

Specific market behavior (e.g., BrokerTec Workup orders) will not be performed.

The matching engine reconciles the bid and offer quantities working in the production market with the activity of the TT SIM™ trader. However, in certain scenarios, the matching engine may not exactly mimic the results the trader would experience in a production market.

For example, TT SIM™ does not match orders when the production markets are the following states:

- Pre-Open
- Pre-Trading
- Price Discovery (SFE)

However, TT SIM™ will match orders when the production market are in all other states.

For information on configuring pro-rata matching in TT SIM 7.16.1 and higher, refer to the section called **Pro-rata Matching Support** on page 13.

Matching Behavior

The TT SIM™ matching engine acts as the "exchange" that the Order Server and Price Server connect to. The following describes the behavior of the TT SIM™ matching engine:

- At start up, the matching engine will connect to the TT User Setup production server and download the products that the trader who has logged in is permissioned to trade in TT SIM mode.
- The full product and contract information for these products is then downloaded from the Gateways in the environment.
- The product and contract information is then sent to the Price Server, which enables the Price Server to process product and contract download request from client applications on the workstation.
- At this time, trader risk limits are downloaded from the production TT User Setup database.
- The trader risk limits are sent to the Price Server to service logins from client applications.

  The matching engine is now active.

While active, the matching engine performs the following tasks:

- Subscribe to prices for all contracts for which it will perform matching.
- Forward price updates from the production Price Server to the TT SIM™ Price Server.
- Wait for orders submitted by the trader to be forwarded to the matching engine from the TT SIM™ Order Server.

Upon receiving an order, the matching engine will:

- Determine if the order should match against any prices received from either the production Price Server or any orders currently working in the

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matching engine.

- If the matching engine determines that this is the case, it will generate a fill and send it to the Order Server then send a Last Traded Price/Quantity update to the Price Server.
- If the matching engine determined that the order should not match against any prices received from either the production Price Server or any orders currently working in the matching engine, it will send a bid/offer market data update to the Price Server that includes this new order.
- When updates are received from the production Price Server, the TT SIM™ matching engine will determine if they should be matched against any working orders the trader has submitted. If so, a fill and LTP update will be generated.

Matching in SIM vs Prod

The TT SIM matching engine incorporates production price updates with simulated prices generated by synthetic orders. Position in queue is maintained in a conservative fashion. A simulated order can trade against a production price update only if the Traded Volume from production has increased. This guarantees that position in queue can advance, possibly generating a simulated trade, only if production orders with a higher priority traded out.

Simple reductions in quoting quantity, or even increases not accompanied by a change in Volume, do not result in trades, as the production orders could merely have had their quantities reduced, maintaining position ahead of simulated orders. In this way, conservatively interpreting production price updates, TT SIM maintains a simulated order's position in queue in as realistic a way as it is able.

Product States

TT SIM utilizes a smaller subset of product states than those found in production trading. TT SIM maps the various product states as listed in the table below:

Product State in Simulation	Product State in Production
Pre-Trading	Pre-Open
	Pre-Trading
	Price Discovery
Open	Trading
	Fast-Market
	Auction
	Open Auction
	Close Auction
	Reserve
	Leveling
Closed	Closed
	Post-trading
	Freeze
	Expired
	Circuit-breaker
Not-Tradeable	Not-Tradeable
Unknown	Unknown

Note: The Open state is not available in the Market State Block in ADL™; for this Block, the Trading state is used instead.

Table 5. Product State Mapping

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Pro-rata Matching Support

Overview

TT SIM 7.16.1 and higher offer Pro-rata matching for specific products. Products that do not support Pro-rata are matched using First-in, First-out (FIFO) time/ priority matching. The matching occurs as configured regardless of the matching engine of the underlying market.

Older versions of TT SIM only allow for First-in, First-out (FIFO) time/priority matching.

This enhancement allows users to:

- run strategies against pro-rata matching.
- assess trader performance against a pro-rata matching engine.

Types of Pro-rata Matching

Under FIFO matching, large orders may prevent orders with smaller volume from trading in the inside market. Pro-rata matching allows orders of different sizes access to trade in the inside market.

TT SIM 7.16.1 and higher supports the following pro-rata matching types:

- Vanilla (Basic): all orders on a price level get an equal proportion of lots.
- Priority: **The first order which betters the current market obtains priority status.** The Priority order is allocated before any other order is allowed to match.

  In addition to basic Priority, you can configure Priority with the following conditions:

  - Priority + Minimum volume: The order must meet the minimum volume threshold to obtain priority status.
  - Priority + Volume Cap: The first order which betters the current market obtains priority status however, this only applies to the volume up to the volume cap. The remaining quantity matches according to the standard vanilla pro-rata matching scheme.
  - Priority + Min Volume and Volume Cap: an order is given priority status only if it meets minimum volume, however, only for the volume specified in the volume cap. The remaining order quantity will be filled by vanilla pro-rata matching.

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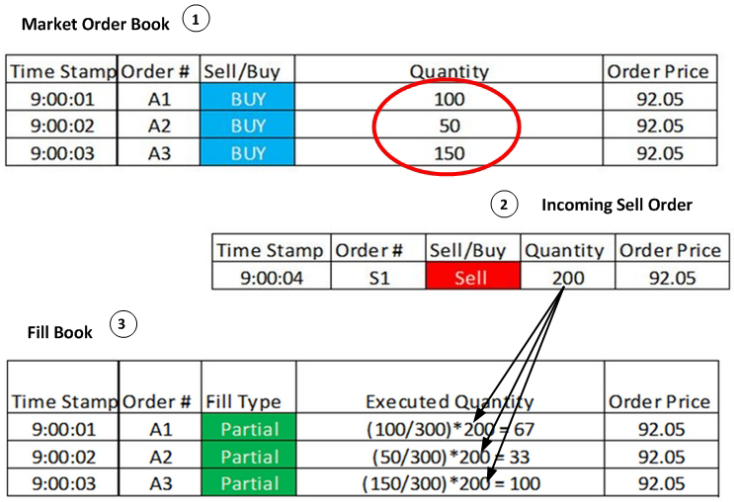
Pro-rata Matching Example 1: Vanilla

The following figure shows an example of Vanilla Pro-rata matching.

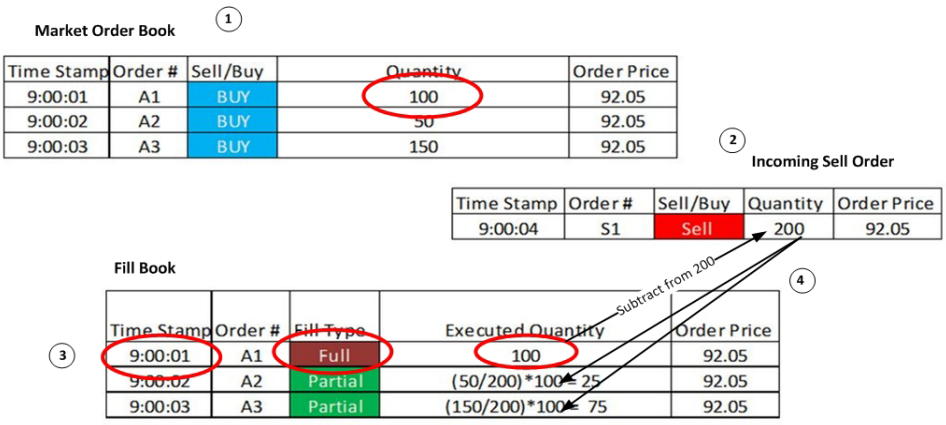

Market Order Book
1
Time Stamp | Order # | Sell/Buy | Quantity | Order Price
9:00:01 | A1 | BUY | 100 | 92.05
9:00:02 | A2 | BUY | 50 | 92.05
9:00:03 | A3 | BUY | 150 | 92.05
2
Incoming Sell Order
Time Stamp | Order # | Sell/Buy | Quantity | Order Price
9:00:04 | S1 | Sell | 200 | 92.05
Fill Book
3
Time Stamp | Order # | Fill Type | Executed Quantity | Order Price
9:00:01 | A1 | Partial | (100/300)*200 = 67 | 92.05
9:00:02 | A2 | Partial | (50/300)*200 = 33 | 92.05
9:00:03 | A3 | Partial | (150/300)*200 = 100 | 92.05

In this figure:

1. Three Buy orders are entered at the same price for a total quantity of 300.
2. An incoming Sell order is entered for a quantity of 200.
3. Each Buy order at the same price level gets filled based on their proportion to the total Buy quantity (e.g., 100/300) and the same incoming Sell quantity (e.g., (100/300) * 200=67). Any unfilled quantity (e.g., 100-67=33) remains working in the market.

Pro-rata Matching Example 2: Priority

The following figure shows an example of Priority Pro-rata matching.


Market Order Book
1
Time Stamp | Order # | Sell/Buy | Quantity | Order Price
9:00:01 | A1 | BUY | 100 | 92.05
9:00:02 | A2 | BUY | 50 | 92.05
9:00:03 | A3 | BUY | 150 | 92.05
2
Incoming Sell Order
Time Stamp | Order # | Sell/Buy | Quantity | Order Price
9:00:04 | S1 | Sell | 200 | 92.05
Fill Book
Subtract from 200
4
3
Time Stamp | Order # | Fill Type | Executed Quantity | Order Price
9:00:01 | A1 | Full | 100 | 92.05
9:00:02 | A2 | Partial | (50/200)*100 = 25 | 92.05
9:00:03 | A3 | Partial | (150/200)*100 = 75 | 92.05

In this figure:

1. Three Buy orders are entered for a total quantity of 300.
2. An incoming Sell order is entered for a quantity of 200.
3. The first Buy order that betters the market gets "priority" and is filled. In this example, Order "A1" appears first at 9:00:01 and a full quantity of 100 is filled.
4. The filled quantity of 100 is subtracted from the Sell quantity of 200, leaving a Sell quantity of 100 remaining. Buy orders for the remaining Sell quantity are partially filled using Pro-rata matching. Any unfilled quantities remain working in the market.

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Configuring Products for Pro-rata Matching

TT SIM 7.16.1 and higher includes the **TTSimMatchingDefaults.cfg** file that determines which products by default use Pro-rata matching. The file is divided into sections based on exchange and asset class.

Example: NYSE Liffe and Eurex exchange and asset class sections in TTSimMatchingDefaults.cfg

```
TT SIM Simulation Parameters File 1.0
SimulationParameters {
    ProductProperties {
        OrderDelay {
            default 50
        }
       MatchingType {
            default fifo
       NYSE_Liffe {
        FUTURE {
            # priority
            prorata,0,0 [ I K J L M M2 S K2 EON EO3 USW USO USP O P TWS
            ]
        }
        OPTION {
            # priority
           prorata,0,0 [ R I K J L M M2 S K2 EON EO3 USW USO USP O P TWS
            ]
        }
}
Eurex {
        FUTURE {
            # vanilla
            prorata [ FE01 FEU3 OEU3 OEUH OEUM OEUU OEUZ ]
```

To configure products for Pro-rata Matching

1. In a text editor, open **<root drive>:\tt\config\TTSimMatchingDefaults.cfg**
2. Add/remove products in a section.
3. Change the pro-rata parameter to change the style of matching as needed.

   The `prorata` parameter is followed by two values: The first value represents minimum volume and the second represents volume cap.

Example: CME pro-rata configuration for Eurodollar options

```
# Eurodollar options (Priority with Minimum Volume)
            prorata,50,0 [ GE GE0 GE2 GE3 GE4 E04 E01
            ]
```

4. Save the changes and close the file.
5. Restart TT SIM from the X_TRADER control panel: Click **Settings** and select **Simulation Settings...** then click **Restart Simulation**

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Products and Matching Type

The following tables list the products and type of matching that TT SIM supports by default:

Product Type	Matching Type	Product Symbols
CME Futures	Priority	SEV SDV DFV EJ SFV KEV GLB EB STV KDV OSS GE EED SKV KFV DNV DTV KTV MNY CNY ISM CB WP CSC GNF GDK LE DY DC GF Q02 LBS Q04 CPO Y01 HE Y03 Y02 Y04 Q06 SG1 CCA SG2 REU FLY NXS NXA NBZ ULS HOL 7FT CLS BZS BZL CLL RBL HGT GCT SIT ZM ZL EH XW XC ZC ZO ZW QS5 ZS XK QCW DDG QM2 AW ZR QC3 QO2 SQ2 WQ6 QW2 QC8 QS9 QO6 QC6 QM6 QW3 SQ5 QX5 QC2 QS2 QC4 QW6 S7C ZWC SA 7I ZT ZQ SR Z3N I3 IS MWE IW IH IC IP
	Priority with Min Vol and Volume Cap	KE
CME Spreads	Priority	EJ GE GLBGE EB OSS GLB CNY MNY DY CSC GNF DC GDK ISM WP CB LEHE LBS HE GF CSCDC CPO LE REUEAF FLYEAF FLY REUCPL REU CCA REUCRE ULS BZS RBT NGT CLT CLS CLL NBZ RBL HOL PPM PPE BZL HOT ZM EH ZL XC ZO ZW XK ZS ZMZLZS ZR DDG XW ZC AW ZCZW ZQ SR ZT 7I ZB ZF UB I3 Z3N SA ZN IS IC IP IH IW MWE
	Pro-Rata (Vanilla)	RME KRW 6Z 6B FXD RMB 6S RMY 6A ILS 6J J7 TRE TRY 6L 6M CZK CJY PLN 6C RP ESK 6R SEK RF SJY ACD PJY NOK 6E PSF EPZ 6N AJY EHF HUF RY E7 EAD ANE ECD ECK ENK
	Priority with Min Vol and Volume Cap	YM DD OZQ OZF OZN OZB ZB2 OZC OZS OZW OZM OZL ZC1 ZS4 ZN4 OUB ZC4 UB4 ZB4 ZN1 OZO UB2 ZF1 OZT ZF4 ZT4 ZB1 ZT2 ZT1 ZC2 OMW KE OKE
	Priority with Min Vol	Eurodollar Option Spreads: GE GE0 GE2 GE3 GE4 E04 E01
CME Options	Priority	LAX CUS CHI NYM CAO ERO ULO ULE C26 U30 U27 U01 U26 C30 C25 C27 C01 L01 L27 L30 L26
	Priority with Min Vol and Volume Cap	MCW ZW1 MC6 OZC OZS OZO ZM1 CZ6 OZL OZR OZM OZW 12S ZL1 ZL2 ZM4 WCM OEH CZM ZS1 CWZ ZS4 ZCW CZC SZ9 ZM2 CZW CZ8 ZC2 ZL4 ZC4 ZC1 CZS ZW2 SZK SZ4 WC6 CZL 12C ZS2 SZ5 ZW4 OC6 SZH 12W SC7 OUB ZN1 ZF4 ZQ1 OZF O7I OZQ ZQ6 OI3 UB4 OZT OZN ZB2 ZT4 ZN4 OSR OSA OZB ZT1 ZF2 ZB4 UB1 ZN2 ZF1 ZT2 ZB1 UB2 OMW OIH OIC OIP OIS OIW OKE
	Priority with Min Vol	Eurodollar Options: GE0 GE GE3 E04 GE2 EJ OSS GE4 SPO E03 E01
CME Energy	Priority	PPD PPB PPE NNT PPM

Table 5. CME Products with Pro-rata Matching

Product Type	Matching Type	Product Symbols
NYSE Liffe Futures	Priority	ED I K J L M M2 S K2 EON EO3 USW USO USP O P TWS
NYSE Liffe Options	Priority	R I K J L M M2 S K2 EON EO3 USW USO USP O P TWS

Table 6. NYSE Liffe Products with Pro-rata Matching

Product Type	Matching Type	Product Symbols
Euex Futures	Pro-rata (Vanilla)	FE01 FEU3 OEU3 OEUH OEUM OEUU OEUZ

Table 7. Eurex Products with Pro-rata Matching

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Trading with TT SIM

X_TRADER

When in simulation mode, traders have access to all X_TRADER® Pro functionality even if they do not have a production X_TRADER® Pro license.

Also, all X_TRADER® workspaces are portable between simulation and production. If a workspace is created and saved when connected to TT SIM™, it will load and subscribe to prices for all products when opened in production. If a workspace is created and saved in production, it will load and subscribe to prices for all products when opened in simulation. Once in simulation, most X_TRADER® windows display a gold 'Simulation Bar' across the top.

The following windows do not contain the Simulation Bar:

- Market Explorer
- Create Strategies
- Autospreader Manager
- Alerts Manager
- Plug-ins
- Properties
- ADL window

Strategies

At this time, TT SIM™ does not support strategy creation. However, you may access and trade all strategies that exist in the production markets. Market data for the strategies themselves will appear correctly in TT SIM™. However, since TT SIM™ includes your trades that have entered the simulated market, you may see different prices on the leg fills than are actually being traded in production.

Spreads

You must observe the following when trading spreads with TT SIM™:

- Only calendar spreads are supported
- TT SIM™ uses the following hierarchy when determining which market data to use for calculating the underlying leg prices:
  1 Inside market
  2 Last traded price
  3 Settlement price

Implieds

TT SIM™ now merges exchange-provided implieds with the direct prices. The exchange-provided implieds are forwarded to the TT SIM™ matching engine and appear merged with the direct prices in the TT SIM™ price feed, but do not appear in the Implieds column in X_TRADER.

Audit Trail

When in simulation, the Audit Trail only reflects transactions that are specific to TT SIM™. TT SIM™ generates a separate, simulation version of the **auditlog_date.mdb** in the **tt\logfiles\sim**.

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Algo Strategy Engine

TT SIM™ installs with a free, local version of the Algo Strategy Engine. The local Algo Strategy Engine runs on the trader's workstation and is only accessible in simulation mode. This allows traders to fully test ADL strategies even if they do not have access to a licensed network Algo Strategy Engine.

Note: In Guardian, the local Algo Strategy Engine (and all sim available TT Gateways) appear with the same IP address of the local workstation.

When launching strategies, traders will need to select the local Algo Strategy Engine in the Algo Dashboard window. To allow easy access to the same strategies in both simulation and production mode, traders should store all strategies in the same folder.

Strategies that are designed and launched in Algo Strategy Engine in TT SIM™ mode can be edited and launched in production. Conversely, strategies that are edited and launched in production mode may be edited and launched in TT SIM™ mode. Both of these scenarios do not require additional changes to be performed.

Synthetic Strategy Engine

TT SIM™ includes a simulated Synthetic SE server which runs locally on the X_TRADER workstation when operating in simulation mode. Synthetic orders provide functionality that is not natively supported by the exchange allowing users to reduce market impact and improve the timing of conditional execution.

TT SIM™ supports the following synthetic order types individually and in combinations:

- Timed (Start Date/Time, End Date/Time)
- Triggered (Stops, If Touched)
- Trailing (Stops, If Touched, Limit)
- Sliced (Iceberg, Time Sliced, Volume Sliced, Time Duration, Volume Duration)
- Retry (Machine Gun)
- Stop, If Touched, Trailing Stop, Trailing If Touched, and Iceberg orders are native on some exchanges. The Override Native checkbox found in the Order Pane allows users to send natively supported order types to the Synthetic Strategy Engine (Synthetic SE) instead of directly to the exchange.

Note: TT SIM™ 7.16.2 or higher supports the Synthetic Strategy Engine's staged orders functionality.

X_STUDY

When in simulation mode, X_STUDY® users can continue to view updated charts. All TT SIM™ trades and activity will be reflected in X_STUDY® until the user switches back to production mode. Switching back to production mode clears all trades and data generated in simulation and allows X_STUDY® to provide an accurate view of production market activity.

Note: X_STUDY® requires access to a production version of the Financial Market Data Server (FMDS).

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Creating Custom Markets

Following a market close, TT SIM™ continues to display market data based on the last snapshot received from the exchange. In addition, TT SIM™ responds to orders entered by the user. By leveraging multiple customer accounts, users can create custom markets after the market close.

Note: Users may disable this functionality by using the 'Avoid orders that cross' setting in TT User Setup.

AR 1/3/12: Per PCR 168858.

To create a custom market:

1. Leave X_TRADER® in simulation mode and connected to the exchange through the market close.

Note: The Price Server must be active and subscribed to the products while the contracts are available.

2. Create multiple, unique customers in the **Customer Defaults** window. Each should use a unique account number.
3. In **MD Trader**, open the product(s) you would like to create a custom market. X_TRADER® displays the most recent snapshot of market activity.
4. Right-click the MD Trader window and enable the **View My Orders Only** and **Filter by Customer Account** options.
5. Right-click the **MD Trader** window and select **Clone**. A second **MD Trader** window appears.
6. Select a different account in each **MD Trader** window. You may now enter separate orders and launch different algos in each window and monitor the effect in the custom market.
7. You may enter additional **MD Trader** window with separate customer accounts to create a larger market.

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Administrating TT SIM

Trader Setup

By default, TT SIM™ leverages existing TT User Setup trader configurations to determine available products and trader risk limits. This allows traders to experience their production trading environment in simulation without additional configuration.

TT SIM™ does not support trader configurations that allow access to all products for a particular product type. These configurations populate an asterisk in the Product column in the TT User Setup Product Limits window.

If a particular product type is configured to access all products in production, administrators must create separate trader setups for simulation.

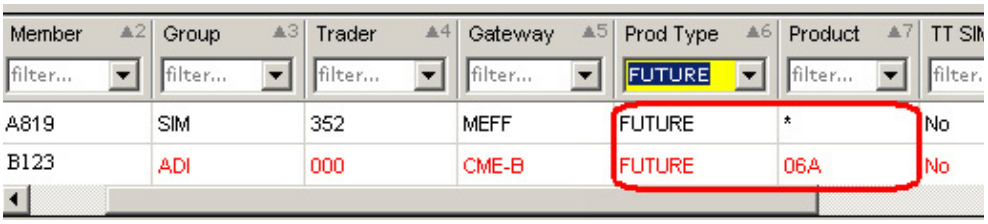

Figure 4. TT SIM and Product Limits

Note: In the image above, Member B123 has product limits assigned for Futures. Member B123 does not require a custom setup for simulation but may optionally create one.

Member A819 is configured for all Future products. Therefore, the administrator must create a custom, TT SIM only setup and assign specific Futures products for that Member.

Risk Checking

TT User Setup, rather than Guardian, is used for risk checking in TT SIM™. The risk limits set up in TT User Setup are controlled by your administrator. By default, TT SIM™ will impose the trader's production risk limits.

Note: It is possible to obtain separate risk limits for production and simulation trading. Adding or modifying risk limits intraday will not require a restart. For more information, contact your System Administrator or refer to the *TT User Setup System Administration Manual*.

Credit and Product Limits

TT User Setup supports TT SIM™ mode trading using existing gateway logins and user profiles. Gateway logins and user profiles are configured as usual, with the following exceptions:

- If you want the credit limit to be higher or lower for TT SIM™ trading, you can set a different TT SIM™ credit limit for gateway logins and user profiles. If you do not set a TT SIM ™ credit limit, then non-TT SIM™ credit limits are used.
- If your existing product limits are configured with wildcards (*), you must configure a new product limit that has a specific product type and product. Users trading in TT SIM™ mode will not be able to see instruments with product limits that are configured with wildcards.
- If you want the product limits to be different for TT SIM™ mode trading, you can create a new product limit and specify that it only applies to TT SIM™ trading. If you do not create a TT SIM Only product limit, TT User Setup will use the existing product limit settings for the instrument.

For more information on setting limits, refer to the *TT User Setup User Manual*.

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TT Gateways

TT SIM™ leverages the TT Gateways that already exist in your trading environment for access to their production price feed. Therefore, you may only trade products that are available on your existing TT Gateways. Also, if configured for coalesced prices in production mode, you will automatically receive coalesced prices in simulation mode.

To reduce load on the production environment, TT SIM™ can only access gateway product types that do not allow access to all products. For example, Member A819 in Figure 4 allows access to all MEFF Futures products. Therefore those traders will not have access to MEFF Futures products while in simulation mode. In addition, the MEFF Gateway will not appear in the simulation Guardian.

Note: In simulation mode, all TT Gateways appear with the same IP address as the local workstation when viewed in Guardian.

Since TT SIM™ simply consumes production market data, it supports basic trading on all existing and future TT Gateways. At this time, TT SIM™ does not support exchange-specific functionality.

Guardian

TT Gateways do not appear in the simulated Guardian if they are configured without product limits (i.e., all products on that gateway use the asterisk (*) wildcard to access all products).You can add these Gateways by creating specific product limits in TT User Setup.

Regardless of your trading mode (sim or prod), using the **Collect Logfiles** functionality retrieves both simulation and production files. All production logfiles appear in the **tt\logfiles** directory while simulation logfiles appear in **tt\logfiles\sim**.

Coalescing Intervals

The price output from TT SIM™ is automatically coalesced. However, usage scenarios differ depending on the hardware and habits of TT SIM users, so you can configure the trade data and non-trade data coalescing intervals to simulate your production environment.

Trade data is immediately relevant to making trading decisions and consists of the following:

- Inside Market
- Market Depth
- Last Traded Price (LTP) of the most recent trade in the interval
- Last Traded Quantity (LTQ) of the most recent trade in the interval
- Trade State
- Total Traded Quantity (TTQ)

Non-trade data is non-actionable and not as time-critical or immediately relevant to trading decisions and includes:

- Time & Sales
- LTP of all trades in the interval
- LTQ of all trades in the interval
- Settlement prices
- Open and Close prices
- Session Status

In the **tt\config\TTSimParams.cfg** file, you can configure `TradeDataUpdateInterval` and `NonTradeDataUpdateInterval` parameters to change the default coalescing interval in TT SIM. For example, you can configure

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these parameters to reduce coalescing of TT SIM's price output to more closely match that of a non-coalesced production feed.

The **TTSIMSimulatedExchange** log file (**TTSIM-ZSimulatedExchange** in 7.16.1 or lower) shows which parameters are copied from **aconfig.xml** and **aconfig_local.xml** files to **TTSimParams.cfg**. The following table shows the default values copied from the production files for the TT SIM coalescing parameters:

Aconfig	TTSimParams.cfg	Default Value (ms)
AConfig.Core.Server.Exchange-Specific.<exch>.Price-Server.NTDUpdateInterval	NonTradeDataUpdateInterval	20
AConfig.Core.Server.Exchange-Specific.<exch>.Market-Depth.Interval-mSecs	TradeDataUpdateInterval	20

Table 5. TT SIM Coalescing Parameters

Components and Services

All TT SIM™ components operate as separate Windows Services. The following table lists all of the TT SIM™ components:

Component/Service Name	Description
TT SIM Manager	Controls all TT SIM components. **Note:** You must first disable TT SIM Manager before you can stop any other TT SIM related service.
TT SIM Simulated Exchange	Manages all matching that occurs in the simulated environment.
TT SIM Product Server	Determines which exchange products are available for trading in the simulated environment.
TT SIM Guardian and TT SIM GuardServer	Performs all Guardian functionality in simulation mode.
TT SIM Order, Price, Fill and Key Servers	Simulates the behavior of each TT Gateway component.
TT SIM AlgoSE	Simulation version of the TT AlgoSE.
TT SIM SSE	Simulation version of the TT Synthetic Strategy Engine.

Table 6. TT SIM Components/Services

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Files

At startup, TT SIM™ copies the production **aconfig.xml** and **aconfig_local.xml** from the **tt\config** directory to **tt\config\sim**. TT SIM reads the aconfig values to determine much of the simulated environment's behavior.

TT SIM creates simulation-specific configuration and log files. These appear in their own sim subfolder as **tt\config\sim** and **tt\logfiles\sim** directories.

Note: TT SIM™ 7.16.1 or lower uses TTSIM-Z as the exchange-flavor for filenames (e.g., TTSIM-ZOrderServer.cfg).

TT SIM™ creates or copies additional files that should not be altered by the user. The table below lists the several key files that users may update or use for troubleshooting.

Filename	Description
Location: **tt\config\sim**	
***ProductFilter.cfg**	The **productfilter.cfg** file contains a list of all subscribed products. You can use the **productfilter.cfg** file as a first step to verify whether a product is properly configured for trading in simulation mode.
TTSimParams.cfg (7.16.2 or higher)	The **TTSimParams.cfg** file provides a centralized location for most simulation options, including those controlled by X_TRADER®. This file contains the user-configurable order delay parameter (`OrderDelay`) that can be used to simulate certain market conditions. The default value is 50 ms.
Environment.cfg	The **Environment.cfg** file lists all values related to the Guardian multicast connection for receiving prices. You can use the **Environment.cfg** file to verify whether TT SIM points to the correct environment for prices.
OrderServer.cfg	For 7.16.1 or lower, the **TTSIM-ZOrderServer.cfg** file contains a user-configurable delay that can be used to simulate certain market conditions. For example, a user can increase the delay value to increase the amount of legging that occurs in the simulation market. For 7.16.2 or higher, the **OrderServer.cfg** no longer specifies the default order delay. This file can still specify delay filters based on Member-Group-Trader ID, but not by product. Product delays can be configured through **tt\config\sim\TTSimParams.cfg**
Location: **tt\logfiles\sim**	
***_*mode*_FillServer_*Date*.log** ***_*mode*_OrderServer_*Date*.log** ***_*mode*_PriceServer_*Date*.log**	TT SIM creates and updates its own fill, order and price server logfiles. Unlike TT Gateways, these files contain actions for all simulated exchanges. You can use this file to troubleshoot issues and errors related to specific TT SIM components.

Table 7. TT SIM Files

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3 Frequently Asked Questions

Requirements

Licensing/Billing

How will customers be charged for TT SIM?

TT SIM™ will be included, for free, with X_TRADER® licenses.

To use TT SIM, what licenses are required? Does TT SIM consume an X_TRADER license?

To use TT SIM™, users must have access to X_TRADER®. However, TT SIM™ does not consume an X_TRADER® license. Also, because the solution depends on live market data, users must have production TT Gateway licenses to access the instruments they wish to trade.

I am not an X_TRADER Pro user. Will I have access to TT SIM?

X_TRADER® users will have full access to the TT SIM™ solution. When in simulation mode, all X_TRADER® users will have access to X_TRADER Pro features even if they do not have an X_TRADER® Pro license.

Network/Environment

Does the market need to be open in order to use the Simulation Solution?

Yes, because all of the market data and instrument definitions come from the live market. In addition, their TT Gateway must be connected to the exchange.

Do I need to run the simulation infrastructure on my own workstation, or can I take advantage of someone else's installation?

Each trader must run their own simulation infrastructure. Simulated data will not leave the client machine, thus "sharing" is not possible.

What TT Gateways does TT SIM work with?

TT SIM underlying architecture is designed to work with all TT Gateways including those currently released and future releases. At this time, TT SIM™ does not support exchange-specific functionality (e.g., BrokerTec Workup).

Do I need additional hardware?

Users can switch between production and simulation on the same workstation. Therefore, TT SIM™ does not require additional hardware. You may require an additional hardware if you want to trade simulation and production at the same time.

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Dependencies

Will I be able to use an old X_TRADER® on the new Simulation Solution, or do I need to upgrade my X_TRADER®?

You must upgrade to at least X_TRADER® 7.11 in order to use the Simulation Solution.

Besides X_TRADER®, what other clients are supported & what version do I need to be on?

Initially, only X_TRADER® will be supported. Future versions of the simulation solution will support FIX Adapter and the other API products.

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Functionality

Market Data

Will there be a price delay in the Simulation solution?

No, TT SIM™ receives real-time live data from the production TT Gateways. TT SIM™ does offer a user-configurable delay that can be used to simulate certain market conditions.

How many instruments can I simulate with the new simulation solution?

TT SIM's overall performance is directly related to the workstation specifications. TT SIM™ has shown remarkable stability when connected to dozens of TT Gateways providing access to hundreds of instruments. The quality of the simulated trading experience increases as the workstation's specifications increase.

Will it be possible for 2 traders, sitting right next to each other, to see different simulated market data?

Yes. The amount of simulated orders and the amount of liquidity in the contract may result in different market data for different traders.

Order Entry

Can I trade both Simulation and Production at the same time from the same workstation?

No, at any given time a user may be logged into the TT System in Production Mode or Simulation Mode – but not both.

Can I trade products in simulation that I can't trade in production?

Yes. The administrator will have the ability to enable products for trading in simulation only.

Is Pro-Rata matching supported?

Yes, Pro-Rata matching is supported in 7.16.1 and higher for certain products. Older versions of TT SIM support First-in, first-out (FIFO) matching only.

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Send Us Your Comments

TT SIM Feature Guide

Version 7.15

Trading Technologies® welcomes your comments and suggestions on the accuracy and usefulness of this publication. Your input is important and valuable in revising our documentation and helps ensure a constantly improving level of quality.

- Did you find any errors?
- Is the information clearly presented?
- Do you need more information? If so, where?
- Are the examples correct? Do you need more examples?
- Which features did you find particularly useful?
- What did you like most about this manual or document?

If you encounter any errors in this document or would like to share other suggestions you might have for improving this document, send comments to: documentation.dept@tradingtechnologies.com.

If possible, please indicate the chapter, section, and page number relevant to your feedback.

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Index

A

Algo SE 18
Algo Strategy Engine 18
Audit Trail 17

B

Block Trades 10

C

Collecting Logfiles 21
Components 22
Configuration 8
Credit Limits 20
Custom Markets 19

D

Dashboard 18
Detailed Depth 10

E

Environment.cfg 23

F

Files 23
    Environment.cfg 23
    OrderServer.cfg 23
Fill or Kill 10
FMDS 18

G

Guardian 21

H

High/Low Prices 10

I

Iceberg 10
If Touched 10
Immediate or Cancel 10
Installation 7

L

Last Traded Price 10
Leg Prices 17
Licenses 24
Limit 10
Logfiles 21
Logging In 8

M

Machine Gun 10
Market 10
Matching Algorithm 11
Matching Engine 11
Minimum Version 6
Minimum Volume 10

O

Order Types 10

P

Product Access 7
Product Limits 20
Product Overview 6
Product Server 22

R

Restart Simulation 8
Retry 10
RFQ 10
Risk Checking 20
Risk Limits 7

S

Scope 4
Services 22
SIM Guardian 22
SIM Manager 22
Simulated Exchange 22
Simulation Bar 17
Simulation Settings 8
Sliced 10
Spreads 17
Stop Limit 10
Stop Market 10
Strategies 17
Strategy Creation 10
Switching Modes 8

T

Trading Technologies International, Inc. Proprietary and Confidential Information

Text formatting conventions 5
Timed 10
Trailing 10
Triggered 10
TT Product Access 6
TT SIM Components 7

U

Underlying Legs 17
Universal Login 8

V

Version 4

W

Wholesale Trades 10

X

X_STUDY 18
X_TRADER Workspaces 17

Trading Technologies International, Inc. Proprietary and Confidential Information